

APPENDIX A

MEETING NOTES

Revised Meeting Notes From
October 19, 1999 Workshop Session

King County CSI Project Meeting Notes (Revised)



Meeting Date: October 19, 1999

Time: 9:00 A.M. to 3:00 P.M.

Location: HDR Main Conference Room

Attendees: See attached list

Subject: North Creek Storage Design/Operations Criteria

Notes:

David Dittmar, King County Water Treatment Division, introduced himself and thanked everybody for attending the workshop. He also introduced the facilitator, Ruth Siguenza, EnviroIssues. Introductions were made. An attendance list is attached as Attachment 1. Ruth Siguenza reviewed the agenda that outlined a discussion of design criteria concerns in the morning and discussion of operation and maintenance criteria in the afternoon.

A key question that was raised in nearly all the discussions revolved around the need for regular cleaning and maintenance of the facility, including:

- How often will the facility require cleaning?
- Will cleaning be done "in-house" or will it be contracted out?
- What ventilation requirements must be met in light of the cleaning, maintenance, and access requirements?
- What lighting requirements must be met in light of the cleaning, maintenance, and access requirements?
- Can the storage facility be designed to be self-cleaning, thereby minimizing or avoiding the risk of workers entering the storage tank?

The decisions regarding the cleaning strategy for the storage tank are critical in determining other requirements, such as odor control strategies, ventilation requirements, lighting needs, and access requirements. Concerns regarding perimeter access, adequate lighting, and safe working conditions for were also raised.

DESIGN CRITERIA

System Hydraulics and Storage Volume

Participants identified the need to determine what volume is going to be stored at the North Creek storage facility for the next 20 years and how the facility will work with the existing and future facilities. Key decisions are also dependent on what comes out of the Regional Wastewater Service Plan (RWSP) and the possibility of constructing a northern treatment plant. According to Bob Swarner, the North Creek storage facility should contain a minimum capacity of 4 million gallons (mg) to store stormwater flows from the north service area. As much as 14

mg of storage could be useful at North Creek or at other locations in the north service area if the North Treatment Plant is delayed beyond 2010.

Bob Peterson, King County Water Treatment Division, noted that the target date for completion of construction for the North Creek storage facility has been advanced from 2005 to 2002.

Participants identified a number of other design criteria to consider:

- Routing of flows that will be pumped from the storage facility
- Timing requirements for design and permitting processes
- Ability to modify the facility for alternative uses after the construction of a North Treatment Plant
- Water surface elevations and the ability to design a gravity flow system into or out of the facility
- Depth of the storage facility and the relationship to the depth of the North Creek pump station wetwell
- Groundwater level (the site has a high water table)

Site Layout Restrictions

After the storage facility is constructed, the City of Bothell hopes to construct a soccer field on top of the site. This implies a need to design the storage facility in a manner that will minimize additional construction or maintenance activities that would disturb the soccer field. Therefore, siting of extra storage capacity must consider recreational use of the facility.

Participants identified a the following design criteria:

- High groundwater elevation
- Use of selectable (controllable) vs. open weirs to route overflow volumes
- Need/type of odor control equipment
- Perimeter access to the facility, including adequacy of lighting for those workers who may need to enter the tank for cleaning
- Frequency of facility operation, including implications of delayed construction of a northern treatment plant
- Operational use of storage facility “just because it is there”

Diversion Structure

Representatives from KCM shared a 1996 technical report on the design for the North Creek Pump Station to assist in the discussion of the storage facility. Operations staff indicated the need to fill the storage tank as simply as possible. The recommended alternative is to design the upper half of the tank to drain by gravity and to use small submersible pump systems to pump out the remaining flow. The design should empty the tank in 12-24 hours depending on the capacities of the West Point and Renton treatment facilities.

A number of participants recommended that the facility have a weir for normal operation and a gate for controlling the transfer of wastewater from the storage facility to the North Creek Interceptor. The advantage of a weir is it helps keep the solids on in the sewer and out of the tank. The hydraulics has to be considered to determine where to divert the flow. The recommended weir to divert the flow to the storage facility could be placed in the Woodinville interceptor or the North Creek interceptor.

Participants discussed the overflow elevation between the cells in the storage tank. Overflow between cells would be sequential. The first cell could be also used for settling and as a primary clarifier. Participants also raised the question of how the Woodinville Sewer District pumps into the conveyance system in light of concerns about differing elevations in the system. However, it was mentioned that the Woodinville PS is between the Woodinville system and the North Cr. Int.

Participants identified a number of other design criteria to consider:

- Use of gates or weirs as diversion structures, including considerations for maintenance
- Use of variable gates to assist in pacing outflows by both gravity and by pumping
- Use of gates on each of the cells in the storage tank
- Use of selectable vs. open weirs to handle overflows
- Placement of the diversion structure to facilitate flows into more than one conveyance line (west or south)
- Locating the diversion structure and the return in the same structure
- Flow into the storage facility by gravity alone or via an operational decision
- Identification of where relief needs to be in the conveyance system so that flows into and out of the storage facility can be controlled; this tank could be viewed as a “trimming station”
- Adequate space to allow room for truck access
- Acknowledgement of the disruption construction activities have on neighbors of the facility

Pump Station

Participants generally agreed that all of the flow will fill and most of the flow (about 60%) will drain by gravity, but the lower portion of the tank will require pumping to drain. Participants debated whether the design should be for a 20-year storm in which all the conveyance facilities were operational or for a 20-year storm that included a power outage that shuts down some facilities. Consideration should be given to the costs of excavation for a storage tank in terms of the depth of the tank versus the footprint of the tank, especially given the high water table on the site. In addition, the peak flow rate needs to be identified. The pump station may not have to be located totally above ground. In fact, location of the pump station underground may make permitting the storage facility easier.

Participants expressed a desired for a fixed speed pump station. Good quality, purpose-built submersible pumps could also be kept in storage for occasional use. A suggestion was made to construct a utilidor that would be accessible for maintenance. Some asserted that the storage

tank would need to be pumped out 12-24 hours after a storm event. The pump station needs to be large enough to match the cleaning requirements of the tank. This relates back to the key question of how often the facility will need to be cleaned and maintained.

Participants raised the following questions regarding the pump station:

- How will flows get into the tank?
- How will the storage facility work when a storm comes?
- Who will be in charge of diverting the flow once the storage facility is full? Will this be an automatic mechanical process or an operational decision by a worker?
- Was a manhole (shown on the drawings) deleted when the pump station was built? If so, should it be added back in during the construction of the storage tank?

Washdown Facilities

The group agreed that a subgroup should be formed to look into options for washdown facilities, including tipping buckets used in Michigan, water cannons as used in Seattle and Sacramento, and other top hinged gate flushing alternatives more common in Germany. During the lunch hour, a video on storage facility cleaning techniques employed in Europe was shown.

Participants raised concerns about looking into the risks to workers of various options and the possible use of remote-controlled operations. In general, it was noted that “more wash water is better.”

Access Requirements

Participants discussed a number of issues related to access, including the ease of entering and exiting the storage tank and surrounding facilities for cleaning and maintenance, the need for cross-connections, and strategic locations for fire hose connections and utilities. One participant suggested that it might just be easier to install oversized pipe and that the designers should look at the trade-offs of a pipe versus a storage tank.

Discussion also included recommendations that any access lift slabs should be able to be moved by a boom truck and that driving access should be wide enough to accommodate these vehicles. In addition, accessible structures need to be strong enough to hold heavy traffic vehicles.

Participants discussed their preferences for design criteria related to access, including:

- “Kid-proof” access
- Preference for stairs over ladders
- Adequate lighting at night
- Access hatches large enough for bobcats to be inserted and adequate bottom floor width to accommodate such equipment
- Easily and continuously accessible first storage tank cell
- Separate access points for each compartment in the storage tank or access to a utilidor

The group recommended that another subgroup be formed to look at access issues.

Odor Control and Ventilation

The design of odor control strategies and ventilation will be heavily dependent upon the decisions regarding how and when the facility will be cleaned. The group agreed to work with the King County Odor Control Task Force on some of these issues.

Participants raised the following issues and questions regarding odor control and ventilation:

- How much should the facility be ventilated?
- How much ventilation is required in relation to the facility's access requirements?
- How much ventilation is required to control corrosion?
- How much scrubbing is required in the ventilation system? Could a scrubber be combined with a utilidor? Could portable scrubbers be used? How bad could the odor become?
- Odor control may be able to be channeled through the existing North Creek Pump Station.
- Could a bio-compost filter be used?
- Maintain awareness of possible public feedback regarding odors
- If odor control is not initially installed, keep the option open to add it at a later date
- It was stated that the facility would generally be used (in the cooler winter months) when odor is less of a problem.

Instrumentation and Controls

Discussions on instrumentation and controls began with one participant wishing for a fully-automated, "take care of itself" system. The instrumentation will be linked to the stand-by power system. Participants noted that design features should be considered that would maintain options for use of the facility for pre-treatment and could make future re-use of the facility easier. For example, could the storage facility be used for a water re-use facility once the northern treatment plant comes on line?

Participants talked about the desirability for monitoring every cell in the storage tank. Information on the rate of fill for the cells was of interest, and participants suggested the importance of knowing the water level at the weir and in the tank.. Participants also discussed the potential use of bubblers. The use of floats and their maintenance was also discussed.

Monitoring was considered important as a part of the early warning system regarding flows, allowing a 12-hour window of opportunity. The storage facility could be a relief station for the Kenmore and North Creek Pump Stations if it has the ability to divert flows to either the west or the south. The gate to the North Creek Pump Station should be able to be opened manually. In addition, the signal to the calibrated gate to drain the storage facility should be able to be controlled by either the North Creek Pump Station or the Renton treatment facility.

Architecture

Participants generally agreed that if there are any associated above ground storage facility structures, they should be brick to look like the North Creek Pump Station. The odor towers and access areas may be the only at grade or above ground structures. The facility design must be submitted to the City of Bothell and the Quadrant Office Park for review. It will also be important to comply with City of Bothell fire and building permits requirements. Designers will need to know the schedule for obtaining the required building permits. There will be no art associated with the facility, although consideration is being given to construction of a soccer field over the storage tank area.

Electrical and Lighting

Participants discussed the lighting needs of the facility. Again, a significant portion of the discussion was linked to the key question of how often access would be needed for cleaning and maintenance. Safety of workers was an important concern. Electrical feed could come from the existing North Creek Pump Station, although most agreed not much power would be required. Power would be needed for cleaning and maintenance work, but how much and what types of conduit and wiring would be needed were clearly dependent on the cleaning and maintenance strategy of the storage facility. Participants also discussed the desirability of installing lights inside the tank and the link to ventilation system requirements. For outside the tank, discussion centered on where lights could be mounted and if the community would request that these lights be used to light the soccer field. There was some agreement that portable lights could be stored on site and used when necessary.

Soccer Field

Participants discussed the potential soccer field requirements of the City of Bothell Parks and Recreation Department who would construct, operate, and maintain the field. There is no written commitment that a soccer field will definitely be built. However, it might be politically difficult to change this potential arrangement. A recommendation was made to become involved with the City in the design and planning of the field in order to better accommodate the needs of the storage facility. Existence of the soccer field could impact the ability to expand the storage facility and to obtain access to the storage tank as the soccer community would not welcome disturbances to an existing field. Soccer fields are in short supply in this area. Soccer parking would not be provided as part of storage facility, and measures (such as a gate) need to be taken to ensure that the driveway to the facility and pump station remain clear at all times. In addition, maintenance obligations between the City and King County should be clearly defined.

A question was raised about the size requirements of a soccer field. Ruth Siguenza agreed to get that information for the group. (see Attachment 2)

Landscaping

Participants discussed the need to meet the requirements of the Quadrant Office Park and to clearly designate who is responsible for maintenance in specific areas around the storage facility.

LOCAL FOUNDATIONS

At lunch, Ralph Boirum provided a briefing regarding the foundation conditions. The existing pump station is supported on both piles (upper slabs) and spread foundations (wetwell). The groundwater level can be virtually at the ground surface. They did not take any borings at the storage site. Borings would have to be done as part of the new foundation investigation for the storage tank. The major geotechnical issues would be dewatering for construction and holding the empty tank in the ground (prevent floating) during high groundwater conditions. Dewatering would require a cofferdam and wellpoints outside of the cofferdam to depress the local groundwater table. Tank hold-down could be accomplished with a combination of concrete mass, extended toes on wall footings, and piles.

OPERATION AND MAINTENANCE

Monitoring Requirements and Control Strategy

See Instrumentation and Controls above.

Routine Maintenance Expectations

The discussion regarding maintenance again revolved around the key question of how much regular cleaning and maintenance of the facility would be required. Participants agreed that research on how other jurisdictions handled these issues was needed. In addition, the design team will need to check out King County safety requirements for workers.

“Event” Operation and Maintenance Expectations

The primary monitoring system will be SCADA. The secondary system is METROTEL.

Security

Participants identified a number of recommendations for security measures for the facility, including:

- Use of padlocks
- Use of square screwdriver holes
- Attention to surface levels in and around the facility, including hatches installed at grade or at elevated levels
- Attention to the existence of “attractive nuisances”
- Use of “graffiti-proof” paint

- Use of fencing, especially around soccer field
- Importance of talking with the Quadrant Office Park about possible design considerations of security features.
- Importance of the security of access features for the storage facility and tank

Access and Confined Space Requirements

Some participants recommended the construction of a utilidor that could house lighting and ventilation systems as well as provide access for maintenance. A utilidor could be accessed by a stairway and could reduce the depth of the access to the final chamber of the storage tank. Once again, this issue is linked with decisions regarding how much regular cleaning and maintenance of the facility will be required. Worker safety remains a crucial concern.

Startup and Training Requirements

Confined space access measures will most likely be required, as will training for workers regarding confined spaces. Workers will also need the standard system training based on the design of the storage facility. There is a need to identify the location of the lowest conveyance system connection. Participants raised concerns about ensuring proper ventilation, and worker training on proper ventilation procedures to eliminate the risk of suffocation.

Design work will need to be coordinated with the City of Bothell Fire Department. Concerns were raised regarding the requirements regarding sprinkler systems. This issue may be addressed through the use of a deluge system in the storage facility.

Operations and Maintenance Manual

Participants agreed that there was a need for an integrated operations manual. This manual could be appended to the existing North Creek Pump Station manual. The manual should contain information on the storage facility equipment and how to run it. This is important since the equipment may not be operated very often. In addition, the manual should emphasize validation of the communication between people inside and outside the tanks when cleaning and maintenance operations are underway to ensure worker safety. Participants also recommended a test of the storage tank and cleaning systems prior to bringing the facility on line.

Wrap Up and Closing

David Dittmar thanked all the participants for their ideas. He will be developing a technical memo that outlines where the project now stands. He also acknowledged the need for a meeting with the City of Bothell to discuss several issues, including work on building and other permits. He noted that there would be regular team meetings to review the design process and its products. The plan is to have all the permits ready by the end of the year 2000, and start construction in 2001 to finish on time by the end of 2002.

ATTACHMENT 1: ATTENDEES

Bill Burwell, King County	Ruth Siguenza, EnviroIssues
David Dittmar, King County	Marina Ruiz, EnviroIssues
Jim Dunaway, King County	Bob Bower, HDR
Michael Fischer, King County	Dan Pecha, HDR
Ron Kohler, King County	Sam Perry, HDR
Leon Maday, King County	Jim Peterson, HDR
Katherine McKee, King County	Ralph Boirum, HWA GeoServices
Doug Nine, King County	Bill Grosvenor, KCM
Bob Peterson, King County	Barry Scott, KCM
Christy Sanders-Meena, King County	
Frank Stratton, King County	
Bob Swarner, King County	
Wendell Umetsu, King County	

ATTACHMENT 2: SOCCER FIELD SIZE REQUIREMENTS

“The field of play must be rectangular. The length of the touch line must be greater than the length of the goal line.

Length: minimum 90 meters (100 yards)
 maximum 120 meters (130 yards)

Width: minimum 45 meters (50 yards)
 Maximum 90 meters (100 yards)

...the Laws may be modified in their application for matches for players of under 16 years of age, for women footballers and for veteran footballers (over 35 years).”

- excerpt from pages 3 and 6 of the *Laws of the Game*, Federation International de Football Association (FIFA), 1998-1999 edition